towards the suppression of the insect pests of cultivated plants. One effect of this welcome energy has been a process of differentiation, whereby the attacks of insects upon crops, instead of being included in the comprehensive but somewhat incomprehensible term of "blight," have been separated one from another, more or less clearly defined, and, to a very useful extent, associated respectively with the ravages of certain specific insects. It is now possible for those to whom the subject is new to obtain a much clearer idea of the scope of agricultural entomology than was the case even as recently as five or six years ago. "The time has arrived," observes the author, "when, if we are to fight insect pests successfully, united action must be taken, and knowledge gained by constant vigilance, and by useful and carefully conducted experiments. Only thus can a better knowledge be obtained of the relations of insects to agriculture, viticulture, and horticulture."

About one-fifth of this volume of 150 pages is devoted to an introduction to entomology, a classification of insects, directions for collecting and preserving specimens of economic interest, the preservation of insect-destroying birds, and certain horticultural quarantine rules. The main part of the book is occupied with a discussion of fourteen of the most troublesome insect pests of apples, pears, apricots, and cherries in the colony of Victoria. These are illustrated by means of coloured plates, the excellence of which demands a word of approbation. The ever-growing facilities for international transport are, no doubt, partly responsible for the extent to which the insect pests of this country are identical with those of the Antipodes. In this connection it is worthy of note that at least five of the pests which are illustrated have acquired as unenviable a reputation in Britain as in Victoria. These are the woolly Aphis (or American blight), the codlin moth, the apple-bark scale, the red spider (an Arachnid), and the pear and cherry slug, which is the slimy, repulsive-looking, leaf-eating larva of one of the saw-flies. Of the fourteen pests enumerated, the Lepidoptera claim four, Coleoptera three, Homoptera two, Heteroptera two, Arachnoidea two, and Hymenoptera one.

The volume concludes with an instructive chapter upon insecticides and the means for applying them. Amongst the more noteworthy of the former are carbon bisulphide, Gishurst compound, hellebore powder, kerosene (petroleum), gas lime, London purple, Paris green, sulphur, and tobacco. A caution is given as to the use of certain so-called insecticides, such as ammonia and carbolic acid. Insecticides they undoubtedly are, but inasmuch as they injure the plant as well as kill its pests, they had better be left alone. Various kinds of apparatus for applying insecticides are described, and illustrated by means of twenty wood-cuts. The most efficient and one of the newest of these, the air-power distributor called the Strawsonizer—after its inventor, Mr. G. F. Strawson, an Englishman,—is adequately described and figured. Several useful nozzles and pumps are likewise noticed.

Mr. French has produced a volume of much practical value, and it may be hoped that he will maintain the same high standard in the subsequent parts. One appeal, however, may be made to the author—and not only to him but to all writers upon this subject,—and that is to append the name of the authority to the systematic name of each insect. Agricultural entomology is necessarily a subject of international interest, and much confusion arises—especially in connection with American writings—through an omission which might easily be remedied. The difficulties of synonymy are great enough, without gratuitously adding to them.

OUR BOOK SHELF.

Farm Crops. By John Wrightson, M.R.A.C., F.C.S. (London: Cassell and Company, Limited, 1891.)

THE author introduces this volume of upwards of 200 pages as "an honest attempt to place the large subject of crop cultivation before the minds of children"; and this is, reasonably enough, his plea for its being "penned in the plainest possible language." The work belongs to "Cassell's Agricultural Readers," and the several chapters deal with rotations of crops, the fallow, root crops, corn crops, grass crops, grasses, clovers and pasture plants, and the making and management of pastures.

Whether agriculture is a subject that can be at all satisfactorily treated, in a book of the type which a "reader" necessarily suggests, is a question that need not be discussed here. But it is abundantly evident that the problem has not been solved in the volume under notice. It is sprinkled with footnotes and tables, the latter being of as complicated a character as any which are usually found in agricultural treatises. Then, again, there are long quantitative lists of grass seeds recommended for use in laying land down to pasture, and these, it is to be feared, will be found both wearisome and unintelligible to the small boy who has to wade through them in the course of a "reading lesson." Indeed, the book is curiously unequal throughout, and it is apparent that the author would probably have done better had he not had to continually remind himself that he was writing a "reader" for children.

It is particularly desirable that, in a strictly elementary book, everything should be correct; but this is hardly the case with some of the illustrations. In Fig. 2, for example, the fruit of the cabbage is represented as dehiscing from above downwards, though this is not the behaviour of a siliqua in nature. On the other hand, the figures of grasses are exceedingly good.

The text is not free from errors. On p. 67 is described what will happen "if turnips braid (*sic*) too thickly." The use of systematic names will rather hinder the juvenile student than otherwise, unless special care is taken to render them correctly, which is not always the case. Occasionally, the fanciful element is in evidence, as when it is stated (p. 207): "Mowing is as old as Time itself; for has not Time been represented as carrying a scythe over his shoulder?"

"In future editions," it is said in the preface, "this little book may, no doubt, be further extended." It is questionable, however, whether the author would not more successfully meet the requirements of a "reader," of the kind which appears to be contemplated, by eliminating all such matters as do not fall easily into the course of a reading lesson. At present, it would seem as if the object had been to produce a "text-book" rather than a "reader."

Arithmetic for Schools. By Charles Smith. "Pitt Press Mathematical Series." (Cambridge: University Press, 1891.)

MR. CHARLES SMITH is such a well-known writer of mathematical works that we expected to find the present volume very commendable. In this we are not disappointed. The explanations of the fundamental principles

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and processes are treated with a clearness, conciseness, and completeness that make the book a delight to read, and although, as he says, "my aim has not been to introduce novelties," yet he has succeeded, in so far as we are able to predict, in placing before students a book not only of practical utility, but also of great educational value.

Stocks and shares, and such like transactions, have all been treated more in accordance with the methods of the present day than is usual in such treatises. There has also been inserted a chapter on foreign exchanges for the benefit of those preparing for examinations in commercial arithmetic. The examples are of a varied and useful nature, and are numerous and well chosen: each new principle or process is accompanied with one or two sets of them, while interpolated throughout are many to be worked out by those who wish to revise their back work as they proceed in the subject. Miscellaneous exercises to the number of 500, together with sets of examination papers, form also a useful addendum. W.

Journeys in Persia and Kurdistan. By Mrs. Bishop (Isabella L Bird). Two Vols. With Portrait, Map, and Illustrations. (London: John Murray, 1891.)

THIS work consists of letters written in the course of the second half of journeys in the East which extended over a period of two years. The author had intended, in the event of their being published, to correct them by reference to notes made with much care. Of these notes she was robbed, and she refers to the loss as her "apology to the reader for errors which, without this misfortune, would not have occurred." Perhaps, however, the book is all the better for being presented essentially in the form in which it was originally written. The record of the writer's impressions has thus a directness, simplicity, and freshness of which it might to some extent have been deprived by elaborate revision. Mrs. Bishop does not profess to have written a book on Persia and Eastern Asia Minor. She has merely set down what she herself saw during her travels in those countries. But she has done this so well that ordinary readers are not likely to resent the slightness of her references to the administration of government, the religious and legal systems, the tenure of land, and the mode of taxation. The illustrations are very good, and add considerably to the interest of the narrative.

A First Book of Electricity and Magnetism. By W. Perren Maycock, M.Inst.E.E. (London: Whittaker and Co., 1891.)

THE scope of this work is limited to the syllabus of the elementary stage of the Science and Art Department. It is intended as an easy introduction to many of the text-books now in use, which, although termed elementary, are of rather too advanced a nature for some students to commence with; the author considering that they might be led to "take a greater interest in their work" by the help of such a book as he has put before us.

Throughout the three parts, which deal severally with magnetism, electro-kinetics, and electro-statics, the explanations are of a plain and simple nature, while the illustrations bring out clearly the various points which they are intended to exhibit. The information is based on the latest ideas; and interpolated in the text are many questions, the answers to which the student should write out before proceeding beyond them.

The book will be found really very useful for beginners, and will be to them a good introduction to higher works.

A Cyclopædia of Nature Teachings. With an Introduction, by Hugh Macmillan, LL.D., F.R.S.E. (London: Elliot Stock, 1892.)

THE compiler of this volume has brought together a large number of extracts from various authors, setting forth what profess to be "facts, observations, suggestions, illustrations, examples, and illustrative hints taken from all departments of inanimate nature." Here is the information offered to us about "the sun-controlled stars":—

"When stars, first created, start forth upon their vast circuits, not knowing their way, if they were conscious and sentient, they might feel hopeless of maintaining their revolutions and orbits, and might despair in the face of coming ages. But, without hands or arms, the sun holds them. Without cords or bands, the solar king drives them unharnessed on their mighty rounds without a single misstep, and will bring them in the end to their bound, without a single wanderer."

This sorry stuff is a fair specimen of a good many of the "Nature Teachings" presented in the "Cyclopædia." A more suitable title for the compilation would have been "Scientific Gush." The compiler does not always even give accurate titles to his extracts. A passage from one of Mr. Ruskin's writings has the strange heading, "The Star Mercury."

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

On the Attitudes of the Zebra during Sleep, and their Influence on the Protective Value of its Stripes.

NOWADAYS, when the colours of animals and their uses for the purposes of recognition and protection are forcing themselves upon the attention of all naturalists, it is not wonderful that an animal so conspicuously marked as the zebra should have commanded a large share of notice.

Much as it has been considered, however, I do not think we have yet learned all the lessons that it has to teach us.

That its bold and vivid stripes should be of immense service for recognition may be accepted as beyond dispute.

The statement of Mr. Francis Galton, that on a clear moonlit night these vivid stripes melt into invisibility, and to an eye not absolutely focussed to the animal itself, but to objects in its immediate vicinity, it is quite unseen, even when so near that its breathing can be heard distinctly, proves most indubitably their immense protective value. As he says, "If the black stripes were more numerous, it would be seen as a black mass; if white, then as a white one; but their protection is such as exactly to match the pale tint which arid ground possesses in the moonlight."

Primâ facie, this is hardly what one would have expected, but when pointed out by a competent and trustworthy observer, even a slight knowledge of the laws of light proves it to be true.

Let anyone notice at what a short distance a lady in a *galatæa* dress with broad stripes becomes invisible in the moonlight, and he will be at once convinced of the truth of Galton's remark.

Prof. Henry Drummond further says:—"When we look at the coat of a zebra, with its thunder-and-lightning pattern of black and white stripes, we should think such a conspicuous object designed to court, rather than elude, attention. But the effect in nature is just the opposite. The black and white somehow take away the sense of a solid body altogether, and the two colours seem to blend into the most inconspicuous grey, and at close quarters the effect is as of bars of light seen through the branches of shrubs. I have found myself in a forest gazing at what I supposed to be a solitary zebra, its presence betrayed by some motion due to my approach, and suddenly realized that I was surrounded by an entire herd, which was all invisible until they moved." By this I understand Prof. Drummond to refer to his observations *in the day-time,* as Mr. Galton speaks only of the moonlight.

One can readily see how the shadows of the branches in a tropical forest falling upon the zebras would so intermingle with the stripes of the animals as to add enormously to the difficulty of recognition by human eyes, and also, in the dim light of the

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